# Cooper's Rocky Mountain Snail (*Oreohelix strigosa cooperi*) Species Conservation Assessment Update

**Title of Assessment: Cooper's Rocky Mountain Snail (*Oreohelix strigosa cooperi*): A Technical Conservation Assessment, USDA Forest Service, Rocky Mountain Region**

**Author: Tamara Anderson**

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**Update Author: John Sovell**

**Date of Update: August 1, 2006**

**Update Summary:** Recent genetic work has resulted in a significant change to the taxonomic status of this taxon, although these changes have not yet been published in a peer reviewed journal. This taxon (*Oreohelix strigosa cooperi*) was originally circumscribed as a subspecies of *O. strigosa*, but it has now been elevated to the level of full species (*O. cooperi*). This research shows that *O. cooperi* lineage in the Black Hills appears to be one genetically distinct lineage within the genus *Oreohelix* and is not genetically equivalent to populations of *Oreohelix* from the broader geographic region under this new circumscription. Although there are other populations of *O. cooperi* outside of the Black Hills, it seems unlikely that they will aid in the proliferation of the species because of their questionable viability. Another recent study provides important data on population size and *O. cooperi* activity across the summer. The results show that using a mark-recapture protocol can be an effective way to sample *O. cooperi* in the Black Hills. It is noted that migration distances are low compared to the grid size used in the study and that observed mortality is low, suggesting a closed population model can provide useful estimates of snail density. The protocol used for estimating density in this study is repeatable and could easily be adapted for long-term monitoring. The report identifies that more information is needed to understand dispersal and other movement in this species and that a longer-term monitoring project with some winter sampling would be helpful in understanding survival in *O. cooperi*. The comprehensive wildlife conservation plans of South Dakota and Wyoming officially recognize *Oreohelix strigosa cooperi* as a species of conservation priority.

**Distribution: Expanded to the West**
**References: New References Provided**
**Taxonomic Status: Changed**
**Agency Status: Nominated as a Candidate Species in 2003; denied in 2006**
**Other: See Below**

**Significance of Changes Relative to Original Assessment:** Future publication in a peer reviewed journal of the suggested changes in the taxonomy of this species would change the systematics reported on in the original assessment. Furthermore, this new understanding in the systematics of this land-snail makes recent efforts to list the Black Hills mountain snail (*O. cooperi*) as threatened or endangered under the Endangered Species Act particularly relevant. If the U.S. Fish and Wildlife Service finds that listing is warranted, than the "Management status" section of the assessment will need updating to reflect this decision. Since the publication of this species assessment the status of this snail as a species of conservation priority has been recognized by both the States of South Dakota and Wyoming in each of their respective Comprehensive Wildlife Conservation Strategy Plans, which could result in opportunities for pursuing funding to support future conservation activities of the species including management, protection and research. Although, a change in taxonomy of this species may be forthcoming a revision of the published assessment is not required at this time.

# Positive Findings of New or Updated Information and Their Sources

(Note: The Table A checklist attached to this update provides a summary of all sources consulted)

## Source 1

Anderson, T, R. Guralnick, and K. Weaver*. 2006. Endemism and population relationships of the Black Hills *Oreohelix* snails, final report. South Dakota Department of Game, Fish, and Parks.

(* note: Kathleen Weaver was recently married, subsequently changing her name to Kathleen Sims)

***Summary of New Information***

This report documents the genetic analysis of *Oreohelix* from throughout the Black Hills (22 sample locations) and from adjacent populations of *Oreohelix* from outside the Black Hills in the eastern ranges of the Rocky Mountains in Montana (3 sample locations), Utah (1 sample location), and Wyoming (6 sample locations). Objectives of the research were to determine if the *Oreohelix* in the Black Hills:

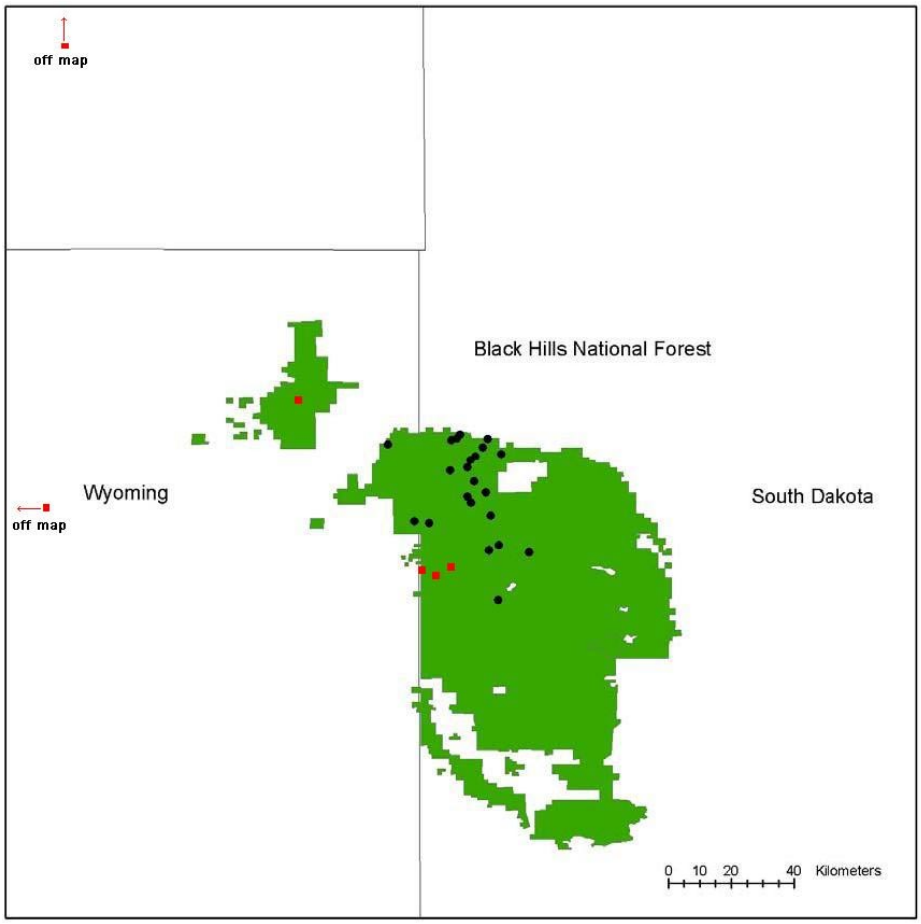
- consists of one or more than one genetic entity and
- represents an endemic group, unique from other *Oreohelix* in the geographical region.

From genetic analysis the authors conclude that the large and small morphs of *Oreohelix cooperi* found in the Black Hills do not represent distinct genetic lineages, but rather reflect some environmental influences not yet detected. This suggests that all populations within the Black Hills should be considered as *O. cooperi* during management decisions, not *O. strigosa cooperi*.

The Black Hills lineage appears to be one genetically distinct lineage within the genus *Oreohelix*. Although there are other populations of *O. cooperi* outside of the Black Hills, it seems likely that these populations are the result of human or animal dispersal events, are isolated to very small areas outside the Black Hills, and are not likely to aid in the proliferation of the species.

One surprising outcome of the research was evidence for little genetic divergence of populations within the Black Hills complex. Given the limited dispersal capability of this snail, its lack of vagility, and a long enough time span, it is expected that the Bear Lodge Mountain populations and Black Hills proper populations would exhibit at least some differentiation, but the genetic analyses reported by these researchers did not document any such differentiation.

This genetic analysis suggests that *Oreohelix cooperi* is not endemic to the Black Hills, but rather that the clade consists of three distinct populations located in the Black Hills of South Dakota, the Judith Mountains of Wyoming, and the Bighorn Mountains of Wyoming, which extends the distribution of *O. cooperi* further west of the distribution reported in the original assessment.




Updated distribution map of the modern range of *Oreohelix cooperi*. Red dots indicate newly identified occurrences.

***Relevant Sections of the Conservation Assessment Affected by the Updates***

Management status, Systematics and general species description, Distribution and abundance

## Sources 2 and 3

Nichols, J., Biodiversity Conservation Alliance, Center for Native Ecosystems, Native Ecosystems Council, Prairie Hills Audubon Society of Western South Dakota, and The Xerces Society. 2003. Petition for a Rule to list the Black Hills mountainsnail (*Oreohelix cooperi*) as Threatened or Endangered under the Endangered Species Act 16 USC 1531 et seq. (1973 as amended) and for the designation of Critical Habitat. Dated: September 24, 2003. Accessed 30 July 2006 at http: //southdakotafieldoffice.fws.gov/final_snail_petition.pdf

U. S. Fish and Wildlife Service. 2006. Endangered and Threatened Wildlife and Plants; 90-Day Finding on a Petition To List the Black Hills Mountainsnail as Threatened or Endangered. Federal Register 71 (39): 9988-9999.

***Summary of New Information***

An official petition to list *Oreohelix cooperi* as threatened or endangered under the Endangered Species Act was submitted on September 24, 2003. This petition was submitted by a number of nongovernmental organizations (see citation two above). The U.S. Fish and Wildlife Service found on February 28, 2006 that the petition did not provide substantial scientific information, indicating that listing *O. cooperi* was warranted. No further status review in response to this petition was initiated.

***Relevant Sections of the Conservation Assessment Affected by the Updates***

Management status

## Source 4

Anderson, T. 2005. Monitoring of *Oreohelix strigosa cooperi* in the Black Hills: year-end report, December 2005. South Dakota Department of Game, Fish, and Parks.

***Summary of New Information***

A mark-recapture study was initiated to determine the population size of *Oreohelix strigosa cooperi* in the Black Hills National Forest and to establish a scientifically sound and repeatable protocol for determining trend in the Black Hills population of *O. s. cooperi*. Four sites (Iron Creek, Beaver Creek, Trebor Draw, Timon Campground) were monitored from May through September of 2005 and snail density, density comparisons to past population size estimates, snail ecology, and environmental conditions of the four sites monitored are reported. It is noted that migration distances are low compared to the grid size used in the study and that observed mortality is low, suggesting that a closed population model, as was used here, can provide useful estimates of snail density.

Estimates of density from this study differed from those of previous studies. Several factors may account for these differences. Density estimates from past studies were based on single samples, while this study employed multiple sample events spread from May through September. The date of sampling can heavily influence estimated population density, and density estimates based on data from a single day are probably not robust.

This study provides important data on population size and snail activity across the summer. The results show that using a mark-recapture protocol with grids of cover-board traps can be an effective way to sample *Oreohelix strigosa cooperi* in the Black Hills. The protocol used is repeatable and could easily be adapted for long-term monitoring.

Data from this study suggest that the presence of *Oreohelix strigosa cooperi* is correlated more with moisture than it is to temperature. Further examination of the influence of moisture and temperature gradients as indicators of habitat suitability is needed. These could be measured effectively and inexpensively throughout the summer using dataloggers.

This report indicates that more information is needed to understand dispersal and other movement in this species, that previously reported rates of survival are not very robust, and that longer-term monitoring including some winter sampling would be helpful to better understand survival in this species. Data on snail size presented in this source indicate they are not “born” at full size but are growing during the season.

***Relevant Sections of the Conservation Assessment Affected by the Updates***

Population trend, Activity pattern and movements, Habitat, Life history characteristics, and Ecological influences on survival and reproduction

## Sources 5 and 6

South Dakota Department of Game, Fish, and Parks. 2006. South Dakota Comprehensive Wildlife Conservation Plan. South Dakota Dept. of Game, Fish, and Parks. Pierre, Wildlife Division Report 2006-08.

Wyoming Game and Fish Department. 2005. A Comprehensive Wildlife Conservation Strategy for Wyoming. Wyoming Game and Fish Department Cheyenne, Wyoming. Accessed on line 28 July 2005 at http://gf.state.wy.us/wildlife/CompConvStrategy/.

***Summary of New Information***

The comprehensive wildlife conservation plans of these two states officially recognize *Oreohelix strigosa cooperi* as a species of conservation priority. The Comprehensive Wildlife Conservation

Strategies (CWCS) are related to the State Wildlife Grants (SWG) program (Public Law 107-63), which provides federal dollars on an annual basis to every state and territory to support cost-effective conservation aimed at preventing wildlife from becoming endangered. Congress created the SWG program in 2001. United States laws and policies place the primary responsibility for wildlife management in the hands of the states. State fish and wildlife agencies have a long history of success in conserving game species, thanks to the support of hunter and angler license fees and federal excise taxes. However 90 percent of our nation's wildlife is not hunted or fished, resulting in insufficient wildlife conservation funding for thousands of species including *O. s. cooperi*.

In order to make the best use of the State Wildlife Grants program, Congress charged each state and territory with developing a statewide wildlife action plan. These proactive plans, known technically as "comprehensive wildlife conservation strategies," identify species and habitats of greatest conservation need and outline the steps needed to conserve all wildlife and vital natural areas for future generations. The U.S. Senate Interior Appropriations Committee appropriated $67.5 million for the State Wildlife Grants Program in FY07. Funds appropriated under the SWG program are allocated to every state according to a formula based on each state's size and population. South Dakota and Wyoming has each received approximately $610,000 in annual funding since 2001 from the SWG program. Formal recognition of a species on a States CWCS plan results in opportunities for researchers to solicit funds from state fish and wildlife agencies to conduct conservation work on that species. The Wyoming plan describes the distribution, status, habitat use, threats, and likely responses to particular management actions for species of the greatest conservation need in the state. This source provides some habitat and non-habitat management recommendations for mollusks that are applicable to *Oreohelix cooperi* .

***Relevant Sections of the Conservation Assessment Affected by the Updates***

Status; Management Status; Management Plans, and Conservation Strategies

## Additional Unabstracted Sources – *pre*-Assessment

**(citations pre-dating Assessment publication that were not referenced in it).**

Hall, J. S., H. J. Marriott, and J. K. Perot. 2002. Ecoregional conservation in the Black Hills. The Nature Conservancy, Midwest Conservation Science Center, Minneapolis, Minnesota. Accessed 30 July 2006 at http://conserveonline.org/docs/2002/04/bhills_final_apr02pdf.pdf.

Lundorff, C. and M. McIlvain. 1999. Spearfish Canyon Management Plan. Spearfish/Nemo Ranger District, U. S. Forest Service, Black Hills National Forest, in cooperation with the CMP Task Group, August 24, 1999, Spearfish, SD. Accessed 30 July 2006 at http://www.spearfishcanyon.com/cmp.pdf.

Spamer, E. E.; and A. E. Bogan. 1993. Mollusca of the Grand Canyon and vicinity, Arizona: New and revised data on diversity and distributions, with notes on Pleistocene-Holocene mollusks of the Grand Canyon. Proceedings of the Academy of Natural Sciences of Philadelphia 144: 21-68.

USDA Forest Service. 2001. Black Hills National Forest 2001 monitoring Report. Accessed 31 July 2006 at http://www.fs.fed.us/r2/blackhills/projects/planning/fy2001_report.pdf.

## Additional Unabstracted Sources – *post*-Assessment

**(citations post-dating Assessment publication that refer to the target genus but were determined by the reviewer to contain no information requiring an update of the original assessment)**

Forsyth, R. G. 2006. An Annotated Checklist (Based Mostly on Literature Records) and Bibliography of the Recent Terrestrial Mollusca of Alberta. Last revised: 25 June 2006. Accessed 30 July 2006 at http://www3.telus.net/rforsyth/alberta/Alberta%20Checklist.pdf.

# Checklist of Sources Consulted for Updates to the Cooper's Rocky Mountain Snail Conservation Assessment

## Guidelines for Producing Updates

Sources of information relevant to review of this Technical Conservation Assessment for updates include databases, experts, personal communications, published and unpublished literature. Positive results are discussed in detail in the Summary of Addendum to the Technical Conservation Assessment.

Internet Literature Searches: The minimal search for each update consists of Google Scholar, Federal Register, plus a minimum of three other available online literature databases. Search terms include at a minimum: species common name, genus, and recent synonyms. Other keywords will be used at the discretion of the updater (e.g., passerine, wetland, rodent). Searches will be constrained to the time beginning two years prior to publication of the Technical Conservation Assessment to the present.

**Table A.** Sources of information consulted for updates to the Species Conservation Assessment.

| Source Category | Source/ Name | Date | Results |
|---|---|---|---|
| Internet based literature databases | Google | 7/24/2006<br>7/30/2006 | Two new sources for search term "*Oreohelix strigosa cooperi*. Two cited but not reviewed, and one cited and reviewed (Reference #2). One new source on search term "*Oreohelix cooperi*"(Reference #6). |
| | Google Scholar | 7/31/2006 | Two new sources for search terms "*Oreohelix*", "*Oreohelix strigosa cooperi*" and "Cooper's Rocky Mountain snail" (References #5 and 6). |
| | Federal Register | 7/24/2006 | The search term *Oreohelix strigosa cooperi* identified one new Citation that is reviewed (Reference #3). |
| | Biological Abstracts | 7/31/2006 | No new sources for search terms *Oreohelix*", *Oreohelix strigosa"*, "*Oreohelix strigosa cooperi*", or "Cooper's Rocky Mountain snail". |
| | Genetics Abstracts | 7/31/2006 | No new sources found for search terms *Oreohelix*", *Oreohelix strigosa"*, "*Oreohelix strigosa cooperi*", or "Cooper's Rocky Mountain snail". |
| | Web of Science | 7/31/2006 | No new sources for search term *Oreohelix*", *Oreohelix strigosa"*, "*Oreohelix strigosa cooperi*", or "Cooper's Rocky Mountain snail".. |
| | ASFA 1: Biology Sciences and Living Resources | 8/9/2006 | One source predating the publication of the assessment for "*Oreohelix*" not abstracted. No new sources for "*Oreohelix strigosa"*, "*Oreohelix strigosa cooperi*", or "Cooper's Rocky Mountain snail". |
| | ProQuest Digital Dissertations | 7/31/2006 | No new sources for search terms "*Oreohelix*", *Oreohelix strigosa"*, "*Oreohelix strigosa cooperi*", or "Cooper's Rocky Mountain snail". |

| Source Category | Source/ Name | Date | Results |
|---|---|---|---|
| | Networked Digital Library of Theses and Dissertations | 8/1/2006 | No new sources for search terms "*Oreohelix*", *Oreohelix strigosa"*, "*Oreohelix strigosa cooperi*", or "Cooper's Rocky Mountain snail". |
| Primary experts | Kat Sims, Ph.D. Student at University of Colorado | 7/24/06 | Contacted twice by email (in May and June of 2006), no response. |
| | Terrence Frest, Deixis Consultants, Seattle, Washington | 8/1/06 | Contacted twice (in April and May of 2006), no response. |
| Federal Agency Personnel | Kerry Burn & Steve Hirtzel, Biologists at USFS on Black Hills NF | 8/1/06 | Potential new records from survey work on Black Hills NF. |
| Museums and Herbaria | | | No new records were recorded from contacts made to the UCM. |
| Announcement from R2 to all FS personnel (including species list) | | | |
| Internal USFS Intranet search | | | |
| Original Author | Tamara Anderson | 7/24/2006 | Two potential new reports (References 1 and 4) |
| State Agencies (e.g., WY Game and Fish, CDOW) | Doug Backlund South Dakota Natural Heritage, in Game, Fish and Parks. | | Two reports: one on monitoring and one on genetics, both completed by Tamara Anderson (References 1 and 4). |